LISTING OF CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently amended) A method of calibrating an oscillator comprising:

~~scaling~~ using a frequency divider to divide the frequency of an oscillator signal to generate a first signal;

~~scaling~~ using a frequency divider to divide the frequency of a reference signal to generate a second signal; wherein generating the first signal and generating the second signal comprise synchronizing the phases of the first and second signals during calibration; and

adjusting the frequency of the oscillator based on a comparison of the first and second signals, the adjusting comprising decreasing the oscillator frequency when the first signal edge arrives before the second signal edge, and increasing the oscillator frequency when the first signal edge arrives after the second signal edge.

2. (Previously presented) The method of claim 1, wherein the oscillator comprises a voltage controlled oscillator, and wherein the generating the first signal comprises applying a calibration voltage to the voltage controlled oscillator.

3. (Previously presented) The method of claim 1, further comprising:
generating a calibration voltage based on temperature; and
applying the calibration voltage to the oscillator for calibration of the oscillator.

4. (Previously presented) The method of claim 1, further comprising:
enabling a phase locked loop after adjusting the frequency of the oscillator; and
testing a voltage control input to the oscillator from the phase locked loop to determine whether calibration should be performed again.

5. (Previously presented) The method of claim 1, wherein the generating the second

signal comprises receiving the reference frequency from a temperature compensated crystal oscillator.

6. (Previously presented) The method of claim 1, wherein the synchronizing the phases of the first and second signals comprises initializing divider circuits for the frequency of the oscillator and the reference frequency at approximately the same time.

7. (Previously presented) The method of claim 1, wherein the oscillator comprises a voltage controlled oscillator including a number of switched capacitors, and wherein the adjusting the frequency of the oscillator based on the comparison the first and second signals comprises activating a subset of the switched capacitors based on the comparison of the first and second signals.

8. (Previously presented) The method of claim 1, further comprising:

enabling a phase locked loop following calibration of the oscillator; and

adjusting a gain of a charge pump of the phase locked loop based on a calibration setting of the oscillator.

9-16. (Withdrawn)

17. (Currently amended) An apparatus comprising:

circuitry that divides the frequency of an oscillator signal to generate a first signal ~~generates a first signal indicative of a frequency of an oscillator;~~

circuitry that divides the frequency of a reference signal to generate a second signal ~~generates a second signal indicative of a reference frequency, wherein the circuitry that generates the first and second signals scales the frequency of the oscillator and scales the reference frequency, and synchronizes the phases of the first signal and second signal during calibration;~~

circuitry that synchronizes the phase of the first signal with the phase of the second signal during calibration; and

circuitry that adjusts the frequency of the oscillator based on a comparison of the first and second signals, the circuitry decreasing the oscillator frequency when the first signal edge arrives before the second signal edge, and the circuitry increasing the oscillator frequency when the first signal edge arrives after the second signal edge.

18. (Previously presented) The apparatus of claim 17, wherein the oscillator comprises a voltage controlled oscillator, and wherein the circuitry that generates the first signal applies a calibration voltage to the voltage controlled oscillator.

19. (Previously presented) The apparatus of claim 17, further comprising:

circuitry that generates a calibration voltage based on temperature; and

circuitry that applies the calibration voltage to the oscillator for calibration of the oscillator.

20. (Previously presented) The apparatus of claim 17, wherein the circuitry that generates the second signal receives the reference frequency from a temperature compensated crystal oscillator.

21. (Previously presented) The apparatus of claim 17, wherein the circuitry that synchronizes the phases of the first signal and the second signal initializes divider circuits for the frequency of the oscillator and the reference frequency at approximately the same time.

22. (Previously presented) The apparatus of claim 17, wherein the oscillator comprises a voltage controlled oscillator including a number of switched capacitors, and wherein the circuitry that adjusts the frequency of the oscillator based on the comparison of the first and second signals activates a subset of the switched capacitors based on the comparison of the first and second signals.

23-33. (Withdrawn)

34-41. (Cancelled)

42. (Previously presented) The method of claim 1, further comprising:

generating a calibration voltage based on a proportional to absolute temperature (PTAT) voltage; and

applying the calibration voltage to the oscillator for calibration of the oscillator.

43. (Previously presented) The method of claim 1, further comprising:

enabling a phase locked loop following calibration of the oscillator; and

initializing divider circuits for the frequency of the oscillator and the reference frequency at approximately the same time after enabling the phase locked loop.

44. (Previously presented) The method of claim 1, further comprising:

enabling a phase locked loop following calibration of the oscillator;

testing a voltage control input provided by the phase locked loop to the oscillator; and

performing calibration of the oscillator again if the voltage control input is outside of a predetermined range of voltages.

45. (Cancelled)

46-53. (Cancelled)

54. (Currently amended) A method of calibrating a frequency synthesizer comprising:

receiving a first ~~scaled~~ divided signal from a first circuitry, the first circuitry configured to ~~scale~~ divide the frequency of an oscillator signal to generate a first circuitry signal;

receiving a second ~~scaled~~ divided signal from a second circuitry, the second circuitry configured to ~~scale~~ divide the frequency of a reference signal to generate a second circuitry signal;

initializing the first and second circuitry at the same time during calibration; and

generating a calibration signal based on a frequency difference between the first circuitry signal and second circuitry ~~scaled~~ signal, the calibration signal decreasing the oscillator frequency when the first circuitry signal edge arrives before the second circuitry

signal edge, and the calibration signal increasing the oscillator frequency when the first circuitry signal edge arrives after the second circuitry signal edge.

55. (New) An apparatus comprising:

means for dividing the frequency of an oscillator signal to generate a first signal;

means for dividing the frequency of a reference signal to generate a second signal;

means for synchronizing the phase of the first signal with the phase of the second signal during calibration;

means for adjusting the frequency of the oscillator based on a comparison of the first and second signals, the circuitry increasing the oscillator frequency when the first signal edge arrives before the second signal edge, and the circuitry decreasing the oscillator frequency when the first signal edge arrives after the second signal edge.

56. (New) An apparatus comprising:

circuitry that divides the frequency of an oscillator signal to generate a first signal;

circuitry that divides the frequency of a reference signal to generate a second signal, the reference signal being an externally generated temperature-compensated crystal oscillator signal;

circuitry that synchronizes the phase of the first signal with the phase of the second signal during calibration; and

circuitry that adjusts the frequency of the oscillator based on a comparison of the first and second signals, the circuitry increasing the oscillator frequency when the first signal edge arrives before the second signal edge, and the circuitry decreasing the oscillator frequency when the first signal edge arrives after the second signal edge.

57. (New) In a receiver for a wireless communication device, an apparatus comprising:

circuitry that divides the frequency of an oscillator signal to generate a first signal;

circuitry that divides the frequency of a reference signal to generate a second signal, the reference signal being an externally generated temperature-compensated crystal oscillator signal;

circuitry that synchronizes the phase of the first signal with the phase of the second signal during calibration; and

circuitry that adjusts the frequency of the oscillator based on a comparison of the first and second signals, the circuitry increasing the oscillator frequency when the first signal edge arrives before the second signal edge, and the circuitry decreasing the oscillator frequency when the first signal edge arrives after the second signal edge.

58. (New) In a transmitter for a wireless communication device, an apparatus comprising:

circuitry that divides the frequency of an oscillator signal to generate a first signal;

circuitry that divides the frequency of a reference signal to generate a second signal, the reference signal being an externally generated temperature-compensated crystal oscillator signal;

circuitry that synchronizes the phase of the first signal with the phase of the second signal during calibration; and

circuitry that adjusts the frequency of the oscillator based on a comparison of the first and second signals, the circuitry increasing the oscillator frequency when the first signal edge arrives before the second signal edge, and the circuitry decreasing the oscillator frequency when the first signal edge arrives after the second signal edge.

59. (New) An integrated circuit comprising:

an oscillator comprising a plurality of switched capacitors for adjusting the frequency of the oscillator;

circuitry that divides the frequency of the oscillator signal to generate a first signal;

circuitry that divides the frequency of an externally generated temperature-compensated crystal oscillator signal to generate a second signal;

circuitry that synchronizes the phase of the first signal with the phase of the second signal during calibration; and

circuitry that adjusts the frequency of the oscillator based on a comparison of the first and second signals, the circuitry increasing the oscillator frequency when the first signal edge

arrives before the second signal edge, and the circuitry decreasing the oscillator frequency when the first signal edge arrives after the second signal edge.